FOREIGN RELATIONS OF THE UNITED STATES, 1964–1968, VOLUME XXVIII, LAOS

274. Memorandum From the Deputy Under Secretary of State for Political Affairs (Kohler) to Secretary of State Rusk[1]

Washington, January 13, 1967.

SUBJECT

Weather Modification in North Vietnam and Laos (Project Popeye)

Proposal

1. The Department of Defense has requested our approval to initiate the operational phase of Project Popeye in selected areas (map at clip)[2] along the infiltration routes in North Vietnam and southern Laos. The objective of the program is to produce sufficient rainfall along these lines of communication to interdict or at least interfere with truck traffic between North and South Vietnam. Recently improved cloud seeding techniques would be applied on a sustained basis, in a non-publicized effort to induce continued rainfall through the months of the normal dry season.

Background

2. A test phase of Project Popeye was approved by State and Defense and conducted during October 1966 in a strip of the Lao Panhandle generally east of the Bolovens Plateau in the valley of the Se Kong River. The test was conducted without consultation with Lao authorities (but with Ambassador Sullivan's knowledge and concurrence) and, to the best of our knowledge, remains unknown to other than a severely limited number of U.S. officials.

3. During the test phase, more than 50 cloud seeding experiments were conducted. The results are viewed by DOD as outstandingly successful.

(a) 82% of the clouds seeded produced rain within a brief period after seeding—a percentage appreciably higher than normal expectation in the absence of seeding.

(b) The amount of rainfall induced by seeding is believed to have been sufficient to have contributed substantially to rendering vehicular routes in this area inoperable. Since the end of the rainy season, the communists have failed to undertake route repairs and there has been no vehicular traffic.

(c) In one instance, the rainfall continued as the cloud moved eastward across the Vietnam border and inundated a U.S. Special Forces camp with nine inches of rain in four hours.

(d) DOD scientists consider that the experiment demonstrated a capacity to raise and maintain rainfall under controlled conditions to the level at which the land is saturated over a sustained period, slowing movement on foot and rendering the operation of vehicles impracticable.

4. In our view, the experiments were undeniably successful, indicating that, at least under weather and terrain conditions such as those involved, the U.S. Government has realized a capability of significant weather modification. If anything, the tests were "too successful"—neither the volume of induced rainfall nor the extent of area affected can be precisely predicted. The only absolute control, therefore, is after the fact, i.e., to halt cloud-seeding missions.

Discussion

5. The present DOD proposal would grant authority for the conduct of cloud seeding activities on a sustained basis. For designated areas in North Vietnam, it would mean taking advantage of the present northeast monsoon (the "Crachin") to increase normal rainfall. The objective is to inhibit overland vehicular movement and to reinforce the bottlenecks already created at stream crossings by the bombing of bridges and ferry installations. With respect to Laos, the objective is to extend rainfall through the dry season (which began in November and continues through April or May), keeping the ground as near the saturation point as possible and obstructing traffic that normally fords streams during the low water period.

6. The assets required for this program are estimated to be very small: extra personnel for existing weather reconnaissance aircraft based in Thailand plus two C–130 aircraft modified for cloud seeding operations with crews, plus supporting personnel. The initial request totals only 33 additional personnel for assignment to bases in northeast Thailand. The cost of the equipment and seeding materials is so low as to be insignificant.

7. A corollary phase of the operation would be to conduct intensified weather reconnaissance and additional experiments in weather modification over international waters in the South China Sea, from Philippine bases—one principal objective being the development of techniques to dissipate cloud cover as well as to induce abnormal rainfall.

8. The proposal differs, in our judgment, from previous weather modification efforts by:

(a) being operational rather than experimental

(b) having military rather than economic or welfare purposes. Approval could thus be considered to constitute a precedent-making decision with major implications for the future. It raises questions in the political, legal, economic, biological, and psychological spheres, many of which cannot be [Page 547] answered adequately in advance of conducting the operation but which are discussed in the following paragraphs.

9. Urgency. DOD wishes to inaugurate operations at once. A prompt decision would (1) enable 7AF to take maximum advantage of present rainy season conditions along coastal areas of North Vietnam, and (2) permit operations in Laos with minimum loss of time between the end of the rainy season and efforts to recreate rainy season conditions along the infiltration routes. With respect to Laos, the period of heaviest anticipated infiltration activity is at hand.

10. Impact in Target Areas. The target areas within North Vietnam are areas of relatively high population density including the town of Dong Hoi, but at least for the first part of the operational period the areas would be undergoing rainy season conditions even in the absence of the proposed operations. It seems reasonable to conclude that the effect of the operation, at least during the normal time span of the wet monsoon, will fall within the range of weather and terrain conditions already experienced at least from time to time. If the operation continued into rice harvest periods, crop damage could result unless seeding was temporarily suspended. The target areas in Laos, by contrast, are characterized by relatively low population density, but the proposed program would drastically change the weather patterns over the next few months—creating to some extent rainy season conditions during normal dry weather periods.

The increased rainfall will inhibit military movement more than civilian movement (to the extent the former is more dependent on motor transport). The effect on military traffic will be to exacerbate difficulties already experienced, to a degree dependent on the extent to which rainfall can in fact be increased on a sustained basis.

The experimental phase of Popeye, conducted during the rainy season, does not provide sure indicators of the extent to which wet weather conditions can be re-created during normally dry periods. But DOD believes the induction of rainfall to be feasible, and to the extent its predictions are realized there would be an undoubted favorable military effect. The road network over which vehicular movement takes place in Laos, despite improvement as well as extension over the past two years, passes through many low-lying areas and is vulnerable to interruption in bad weather, in narrow defiles, along hillsides, and at innumerable stream crossings where bridges do not exist or have been destroyed and where fording is normal practice. Interruption of road traffic would not only retard the normal rate of movement but would also force concentration of trucks that would be more vulnerable to aerial attacks at points known to us because we created the bottlenecks.

Infiltration of troops, on foot, cannot be halted by creation of wet monsoon conditions, although there would be some retardant effect. The same [Page 548] effect would, of course, apply to the freedom of movement and morale of friendly roadwatch and guerrilla teams operating in the same area.

The impact on civilian population will be much the same, in kind, and greater in degree, than that discussed below with respect to areas outside the target zones. The psychological impact will be perhaps greater than any other effect, particularly when conditions characteristic of the rainy season are unexpected.

11. Impact Outside Target Areas. In North Vietnam the impact of successful Popeye operations outside the designated area should be slight. The added rainfall would reach the sea over short distances in the coastal areas where operations would take place or would occur in the mountainous border area that is sparsely populated by tribal peoples. There would likely be some spill over in the form of increased rainfall west of the target areas.

There would be some hypothetical effect of an adverse nature in Thailand where, during the northeast monsoon, normal rainfall might be somewhat diminished as the distance west of the mountains along the Vietnam-Laos border increases. However, as a practical matter, rainfall in the dry areas of northeast Thailand is so slight in this season that any difference resulting from the proposed operation is not likely to be either discernible or meaningful in terms of the water table.

In Laos, there will likely be discernible effects to the west of the proposed areas of operation, toward the Mekong River. These effects cannot be quantified but give us some concern. If the operations approached the goal of keeping the infiltration routes impassable, they might be substantial. Project scientists estimate that it might be necessary to induce rainfall of up to six inches per month, once the ground was saturated, to keep it in that condition. The following are the types of effect foreseen:

(a) In areas where rain falls out of season, the life cycle of plants and animals may be affected. Villagers may unwisely seek to alter planting seasons in the face of uncertainty as to the future implications of the weather changes they experience. If there is heavy and persistent rain, it is possible that more fundamental ecological change may occur, e.g., in the formation of fungi and growth of bacteria which are ordinarily subject to control by the alternation of wet and dry seasons. Although rice production would not be affected by operations during the next few months, cultivation of secondary crops could well be adversely affected in limited areas.

(b) Downstream from the areas of rainfall, there will be effects on the water level, diminishing as tributaries broaden toward the Mekong. Unless monitored to limit induced rainfall to the amounts needed to attain project objectives, intensive sustained operations could produce serious localized flooding. Even at the required tempo of operations, it seems probable that there [Page 549] will be changes in normal water flow. Farmers, for example, who normally move during the dry season across country, through dry stream beds or through shallow fords, may be inconvenienced if not endangered by the unexpected rise of water. In view of the uncertainty as to the extent to which wet-season conditions are likely to be created, we should assume in acting on the DOD proposal that there will be appreciable consequences outside the target areas.

Project scientists are satisfied that the proposed operations would not induce disasters in the form of large and uncontrolled storms. But with respect to Laos, at least, the more successful the operation proved to be with respect to its military objectives, the greater would be our uneasiness with respect to the likelihood of unwanted side effects. The outside estimates of the range of effect of the seeding of a single cloud is an area 50 by 100 miles. If not large meteorologically speaking, any such range would be sufficient to carry the impact into heavily populated friendly areas.

12. Consultation. There are thus legal, and perhaps moral or philosophical, aspects to the question whether the US should utilize the capability we seem to have developed to alter weather conditions significantly. We cannot lightly assume responsibility for unilaterally altering climate, and possibly landforms, in other sovereignties, and particularly for initiating weather warfare with an uncertain extent of injury to civilian populations. The Legal Adviser, I understand, has undertaken a comprehensive study of the legal implications of weather modification—a project that cannot be completed in time to affect the decision on the pending proposal. Your decision should, however, be made in the light of these uncertainties.

With respect to North Vietnam, we believe that as an interdiction measure Popeye operations would be less harmful to the population and area affected than bombing.

With respect to Laos, Ambassador Sullivan has approved the project and indicated he would not plan to consult Prime Minister Souvanna Phouma. His concurrence, however, was based on an assumption that the proposed operations would be conducted under conditions comparable to those of the experimental phase. We believe conditions would be different, notably in that ground saturation might occur during normally dry weather periods and, if successful, be sustained indefinitely. We do not believe a program of this import should be launched in a friendly country without the knowledge of responsible authority, in this case the Prime Minister.

13. Possible Publicity. The DOD proposes to conduct the project under conditions of strictest secrecy, noting that publicity would create vulnerability to communist charges of US manipulation of weather, in the affected areas or elsewhere. We believe the consequences of exposure would be more profound and [Page 550] widespread than this statement suggests. One probable consequence is that many Lao and Thai might immediately attribute to US experimentation the disastrous Mekong flood of September 1966. More irrationally and perhaps with less certainty, there might be many occasions in which uninformed groups in non-communist as well as communist nations would blame the US for climatic abnormalities with which we had no connection. There are apparently still enough people who blame nuclear experimentation for freakish weather phenomena to justify great caution in this regard. We see no way to quantify the political/psychological burden the US might be required to bear in the future but it must be considered a factor relevant to your decision.

At the same time, it seems highly unlikely that such operations could remain secret indefinitely, and our assumption should be that they will become known. In the first place, the altered weather will be observable, in contrast to the experimental phase conducted during normally rainy periods. Disclosure of planned weather experiments in India would make it likely that the connection would become apparent. Secondly, the possibility of a US seeding aircraft being downed cannot be discounted. Thirdly, there is virtually no aspect of military operations in Southeast Asia which has not over time become the subject of leaks or at least of speculation in the press. The possibility of incurring a severe psychological handicap is therefore one of the problems we foresee in connection with the operation.

Even though the adverse impact might be less if the operations were to be announced than as if they simply became known, we believe it is preferable that security controls be maintained as long as possible. The principal advantage of this operation, from the security standpoint, is the relatively small number of individuals involved. Nevertheless, we should be prepared to respond to disclosure by acknowledgment and to anticipated charges by arguing that the action was a more humanitarian attempt to reduce aggression against South Vietnam than undertaking bombing, or firing rockets and guns. But we should anticipate that this line would not satisfy critics both national and international, and it is possible that the issue could be brought before the UN. If the reaction were bad, we could anticipate being blamed for atypical weather phenomena in other areas, whether we were responsible or not, and being accused of using the Vietnam conflict for another type of experimentation with unorthodox and "illegal" methods. The history of communist campaigns against "germ warfare" and chemical warfare might be repeated.

14. Military Effect and Counter-Effect. As previously stated, the results of Operation Popeye should be to add a further impediment to the infiltration and support effort moving from North Vietnam through Laos and into South Vietnam. It is not possible to predict to what degree this infiltration will be [Page 551] impeded by Popeye; however, as a minimum, even if the flow of men and materials is not reduced, Operation Popeye should force the North Vietnamese to pay a heavier price for what they are able to move.

The question naturally arises as to the extent to which the North Vietnamese and Viet Cong might be able to turn this relatively simple technique against us in the current conflict. The present conflict appears to offer a unique opportunity to employ cloud seeding techniques without serious possibility of retaliation in kind. This is based on the fact that successful use of the technique on a scale that could be militarily significant requires almost unrestricted use of the air over the target area. In addition, we are not as dependent on moving large numbers of people and tonnages over long, restrictive and fairly rudimentary roadnets which would be vulnerable to this technique.

While the possibility of effective counter-action in the present conflict may be small, the initiation of cloud seeding as a military measure may well have serious long-range military implications. In essence, it would establish the precedent for altering weather and even climate for military purposes. At some future time, in some as yet unforeseen way, this could prove to be militarily disadvantageous to the US. It is difficult to accept the premise that lack of precedent alone would stop some future use of measures for altering weather or climate should they give promise of providing a militarily significant advantage. But the political consequences of "first use" could prove, as in the case of nuclear weapons, highly relevant to any subsequent efforts to control application of the technique by agreement.

Recommendations[3]

1. That you approve initiation of Phase II of Project Popeye, with the proviso that use of weather-modification techniques be considered still in the experimental phase until additional data are available on the effects. We propose to select among the areas proposed by Defense those which are of highest military priority but to exclude areas of relatively heavy population. We would thus concur on the assumption that Defense experts believe there will be a substantial military benefit from seeding operations limited to the areas authorized. To that end I will, if you agree: [Page 552]
    (a) Limit authorization at present to those operational areas marked in red on the map attached (one in North Vietnam and four in Laos), with the understanding that additional areas among those proposed can be considered on the basis of experience or that operations can be immediately interrupted if the side effects become unexpectedly adverse or criticism too heavy to bear;

    (b) Obtain DOD understanding that weekly operational summaries and special incident reports will be made available to State, in order that monitoring of the operation can be carried out on a current basis and side effects in and outside the target areas can be evaluated;

    (c) Ask Ambassador Martin to obtain concurrence for positioning in Thailand of the limited assets required, and obtain his views whether this operation could be mounted from Thai bases [*less than 1 line of source text not declassified*];

    (d) Instruct Ambassador Sullivan to consult and obtain concurrence of Lao Prime Minister Souvanna Phouma before operations are commenced;

    (e) Ensure that Ambassador Blair is briefed on experimental activities that would be conducted over the South China Sea from Philippine bases before such activities are launched, and determine with the advice of Ambassador Lodge whether consultation with the GVN is desirable before operations are launched against North Vietnam.

    (f) Consider ways to supplement aerial observation in order to ascertain the nature and extent of effects outside target areas, without breach of security;

    (g) Obtain DOD understanding that, because the operation could not be denied if exposed, any compromise of the security cover would require acknowledgement, and develop public affairs materials against that contingency.

    (h) Undertake a review of the results and implications of Popeye in the light of the legal study of weather modification as soon as it is available and, with DOD, explore the longer-range strategic implications for the US of the use of weather warfare; seek, with ACDA, a general policy on meteorological warfare.

2. That State's approval of the DOD proposal in this modified form be made conditional on the President's being advised, and that you consider a joint presentation to the President with Secretary McNamara, in order that he be made aware not only of the significant military advantages anticipated but also of the uncertain but ultimately far-ranging implications of weather [Page 553] warfare in the political, legal, economic and psychological spheres.[4]

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[1] Source: Department of State, Central Files, POL 27 VIET S. Top Secret. Drafted by Hamilton.↩

[2] Not printed.↩

[3] Kohler wrote the following note on the first page of the memorandum: "I have serious doubts—may I discuss this with you." According to a February 7 memorandum from Kohler to Unger, Rusk also had reservations and, after consultations with Kohler, agreed to approve the operation "on a strictly experimental basis" in the five limited areas. Rusk wished to be kept informed of the progress of the project and wanted it to be understood that his approval was not a commitment to approve further steps in the project or broader application of it. (Department of State, Central Files, POL 27 VIET S)↩

[4] In a March 18 memorandum to Secretary of the Navy Ignatius, McNamara stated that, contrary to JCS recommendation, he had disapproved the operational use of the 7th Air Force's OPLAN Popeye. McNamara noted that the testing of Popeye at the Naval Ordnance Test Station at China Lake demonstrated that it was "a potentially powerful weapon against lines of communication in Southeast Asia." McNamara suggested the establishment of an environmental research unit to develop and test the feasibility of weather modification in Southeast Asia. (Washington National Records Center, RG 330, OASD/ISA Files: FRC 71 A 4919, Laos 000.1 (000.93 Laos), 1966)↩

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ABBREVIATIONS & TERMS
DOD
GVN
ISA
JCS
Popeye

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